Claims

Sub.al

1. An apparatus for detecting a hot rail car surface comprising:
an infrared sensor for acquiring an infrared signal from a rail car surface of a
rail car and transducing said infrared signal into an electrical signal;
a rank filter for filtering said electrical signal to produce a filtered array;
a first peak detector for detecting a maximum filtered value of said filtered
array; and
a first comparator for comparing said maximum filtered value to a detection
threshold to produce a filtered alarm signal.

[c2]

2. The apparatus of claim 1 wherein said rank filter has a rank of about one-half.

[c3]

3. The apparatus of claim 1 further comprising:
a wireless transceiver for acquiring rail car surface characteristics from a
wireless tag mounted on said rail car; and
a filter parameter calculator for calculating a filter length and rank of said rank
filter as a function of said rail car surface characteristics.

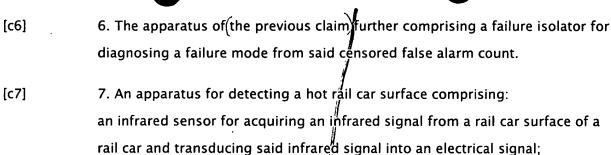
[c4]

4. The apparatus of claim 1 further comprising:
an unfiltered signal buffer for buffering said electrical signal to produce an unfiltered array;
a second peak detector for detecting a maximum unfiltered value of said unfiltered array;
a second comparator for comparing said maximum unfiltered value to said

detection threshold to produce an unfiltered alarm signal; and an alarm comparator for comparing said unfiltered alarm signal to said filtered alarm signal to produce a censored false alarm signal.

[c5]

5. The apparatus of the previous claim wherein: said censored false alarm signal comprises a binary signal having a true value when said unfiltered alarm signal differs from said filtered alarm signal and a false value otherwise; and said apparatus further comprises a counter for counting said false values to produce a censored false alarm count.



a rank filter for filtering said electrical signal to produce a filtered array;
a first peak detector for detecting a maximum filtered value of said filtered array;

a first comparator for comparing said maximum filtered value to a detection threshold to produce a filtered alarm signal;

a wireless transceiver for acquiring rail car surface characteristics from a wireless tag mounted on said rail car;

a filter parameter calculator for calculating a filter length and rank of said rank filter as a function of said rail car surface characteristics;

an unfiltered signal buffer for buffering said electrical signal to produce an unfiltered array;

a second peak detector for detecting a maximum unfiltered value of said unfiltered array;

a second comparator for comparing said maximum unfiltered value to said detection threshold to produce an unfiltered alarm signal; and an alarm comparator for comparing said unfiltered alarm signal to said filtered alarm signal to produce a censored false alarm signal.

[c8] 8. The apparatus of the previous claim wherein:
said censored false alarm signal comprises a binary signal having a true value
when said unfiltered alarm signal differs from said filtered alarm signal and a
false value otherwise; and
said apparatus further comprises a counter for counting said false values to
produce a censored false alarm count.

9. The apparatus of the previous claim further comprising a failure isolator for diagnosing a failure mode from said censored false alarm count.

[c10] 10. A method for detecting hot rail car surfaces, the method comprising:

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[c9]

acquiring an infrared signal from a fail car surface of a rail car; transducing said infrared signal into an electrical signal; filtering said electrical signal using a rank filter to produce a filtered array; detecting a maximum filtered value of said filtered array; and comparing said maximum filtered value to a detection threshold to produce a filtered alarm signal.

- [c11]
- 11. The method of claim 10 wherein said rank filter has a rank of about one-
- [c12]
- 12. The method of claim 10 further comprising:
 acquiring rail car surface characteristics from a wireless tag mounted on said
 rail car; and
 calculating a filter length and rank of said rank filter as a function of said rail
 car surface characteristics.
- [c13] -
- 13. The method of claim 10 further comprising:
 buffering said electrical signal to produce an unfiltered array;
 detecting a maximum unfiltered value of said unfiltered array;
 comparing said maximum unfiltered value to said detection threshold to
 produce an unfiltered alarm signal; and
 comparing said unfiltered alarm signal to said filtered alarm signal to produce a
 censored false alarm signal.
- [c14]
- 14. The method of the previous claim wherein: said censored false alarm signal comprises a binary signal having a true value when said unfiltered alarm signal differs from said filtered alarm signal and a false value otherwise; and said method further comprises counting said false values to produce a censored false alarm count.
- [c15]
- 15. The method of the previous claim further comprising diagnosing a failure mode from said censored false alarm count.
- [c16]
- 16. A method for detecting hot rail car surfaces, the method comprising: acquiring an infrared signal from a rail car surface of a rail car;

transducing said infrared signal into an electrical signal; filtering said electrical signal using a rank filter to produce a filtered array; detecting a maximum filtered value of said filtered array; comparing said maximum filtered value to a detection threshold to produce a filtered alarm signal;

acquiring rail car surface charactefistics from a wireless tag mounted on said rail car;

calculating a filter length and rank of said rank filter as a function of said rail car surface characteristics;

buffering said electrical signal to produce an unfiltered array; detecting a maximum unfiltered value of said unfiltered array; comparing said maximum unfiltered value to said detection threshold to produce an unfiltered alarm signal; and comparing said unfiltered alarm signal to said filtered alarm signal to produce a censored false alarm signal.

17. The method of the previous claim wherein:

said censored false alarm signal comprises a binary signal having a true value when said unfiltered alarm signal differs from said filtered alarm signal and a false value otherwise; and said method further comprises counting said false values to produce a censored false alarm count.

18. The method of (the previous claim) further comprising diagnosing a failure mode from said censored false alarm count.

[c17]

[c18]